

REMARKS

Reconsideration of this application is respectfully requested. The allowance of claims 24 and 26 is appreciated. Claim 25 has been amended to correct its dependency to claim 24 and should be allowed. Several of the other claims were amended to be consistent with the term "pixel regions" versus "pixel region". Claim 22 was substantially amended to include a limitation from claim 1.

Independent claims 1 and 22 have been amended to make more clear that the liquid crystal layer is "continuous". A continuous liquid crystal layer is contrary to an array of liquid crystal pockets as is shown in Yamada et al (U.S. Patent No. 5,473,450 - Yamada '450).

This response after final rejection should be entered because it amends the claims, and points out the flaws in the outstanding rejections to improve their form and to place them in clear condition for allowance.

Acknowledgement is requested of the references submitted with the preliminary amendment on December 21, 2001, and listed on the Notice of References Cited from the parent application. Attached are copies of the two pages of Notice of References Cited that were previously submitted.

I. ANTICIPATION REJECTION

The rejection of claims 1, 3, 9 to 11, 22, 23, 27, 30 and 31 as being anticipated by Yamada et al (U.S. Patent No. 5,473,450 - Yamada '450) is traversed.

Independent claim 22 has been amended to require a liquid crystal layer that is both inside and outside of the pixel regions, and that the liquid crystal layer is thick in the pixel regions and thin in the regions outside of the pixel regions. This feature is already recited in claim 1.

Yamada '450 does not disclose several elements recited in the rejected claims including (without limitation):

- A continuous crystal layer. Yamada '450 discloses an LCD having pockets of liquid crystal. Each pocket is bordered by a resin wall, such that the liquid crystal layer in Yamada '450 is not continuous. By using a continuous liquid crystal layer, the present invention does not require resin barriers defining liquid crystal pockets for each pixel. The present invention provides, for example, easier manufacturing by avoiding the resin barriers disclosed in Yamada '450.
- A liquid crystal layer outside of the pixel regions of the LCD. (Claims 1 and 22). Yamada '450 does not disclose a liquid crystal layer outside of the pixel regions.
- A thickness (d_{in}) of a liquid crystal layer in the pixel region that is larger than a thickness (d_{out}) of the liquid crystal layer outside of the pixel region. (Claims 1 and 22)
- At least one of the substrates has convex portions defining the pixel region on a surface on the liquid crystal layer side. (Claim 3).

- A pair of polarizing plates disposed in crossed Nicols on both sides of the liquid crystal layer, a phase difference plate having a relationship, in which a refractive index $n_{x,y}$ in an in-plane direction is greater than a refractive index n_z in a direction vertical to a plane, being provided on at least one of the polarizing plates. (Claim 9). Yamada '450 (col. 9, lns. 19-26) does not disclose that the crossed Nicols polarizing plates have the relative refractive indices recited in claim 9.
- The thickness of the liquid crystal layer in the pixel region is thickest at a center of the pixel region and thinnest at an outer periphery of the pixel region. (Claim 27).
- An axis-symmetrical alignment fixing layer is provided on a surface of at least one of the substrates on the liquid crystal layer side. (Claims 30 and 31).

Yamada '450 does not have a continuous liquid crystal layer. It also does not have liquid crystal material outside of its pixel regions. The LCD devices disclosed in Yamada '450 have pixel regions that each have a discrete pocket of liquid crystal material. *See e.g.*, Yamada '450, col. 23, lns. 2-30. The pixel regions are separated from each other by polymer resin walls (8). *See e.g.*, Yamada '450, col. 29, ln. 11 to col. 30, ln. 6. The polymer walls are solid and block "liquid" crystal material from flowing outside of the pixel regions. Yamada '450 states as follows:

A liquid crystal display device of the present invention includes: . . . a display medium which is provided between the two substrates and formed of polymer walls containing a polymer as their main component and liquid crystal regions containing liquid crystal as

their main component; and a plurality of pixels,
**wherein the liquid crystal regions are partitioned
by the polymer walls and are close to the
substrates.** [Yamada '450, Abstract] (emphasis
added).

Accordingly, there is no liquid crystal layer outside of the pixel regions in the LCDs disclosed in Yamada '450.

Claims 1 and 22 require that there be liquid crystal material to be continuous and, thus, in regions outside of the pixel regions, as well as in the pixel region. The LCD disclosed in Yamada '450 does not have liquid crystal material outside of the pixel regions. Claim 1 also requires that the thickness of the liquid crystal layer in the pixel regions be greater than the thickness of the liquid crystal layer outside of the pixel regions. This relative thickness feature of a liquid crystal layer is not disclosed in Yamada '450 because there is no liquid crystal layer outside of the pixel regions in Yamada '450. There is no anticipation because Yamada '450 does not disclose several features of the claimed invention. Accordingly, the anticipation rejection should be withdrawn.

II. OBVIOUSNESS REJECTION

The rejection of claims 4 to 6, 25, 28 and 29 as being obvious in view of Yamada '450 and Horie et al. (JP 8-292423)(Horie JP423) is traversed. The claims rejected for obviousness depend on claims 1 and 22, and are allowable for the reasons stated above for the independent claims.

There is no suggestion in the prior art to apply Horie to modify the LCD disclosed in Yamada '450 by removing the partition walls (8) to form a continuous liquid crystal layer or to make further modifications needed to convert the Yamada LCD into the claimed invention. Further, Horie does not disclose a liquid crystal display (LCD) having liquid crystal model molecules that are "aligned in a direction substantially vertical to the substrates when no voltage is being applied."

The reference to "vertical alignment property" in Horie '117 at column 3 is not a teaching of a liquid crystal cell where the entire cell is vertically oriented in the absence of applied voltage, and axially symmetrical in the presence of applied voltage. Because Horie does not teach vertical aligned liquid crystal molecules when no voltage is applied to the substrates, Horie does not teach the same invention that is recited in the claims of this application.

Claims 1 and 22 make clear that the liquid crystal layer is thickest about a pixel region to assist in providing axial symmetrical orientation for the vertically aligned liquid crystal molecules when no voltage is applied. This feature is also not taught by Horie '117. Accordingly, it would not have been obvious to apply Horie '117 to modify Yamada '450 to form the claimed invention.

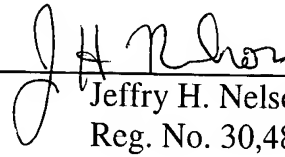
YAMADA et al
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All claims are in good condition for allowance. If any small matter remains outstanding, the Examiner is requested to telephone applicants' attorney. Prompt reconsideration and allowance of this application is requested.

Respectfully submitted,

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